Antarctic Automatic Weather Stations
Field Report 1990-1991
by
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and
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C.R. Stearns boarded the Polar Sea at Hobart, Tasmania on 18 December 1990. The Tasmanian Cargo Services were visited to learn that the Expedition Polaris Francaises (EPF) ship, Astrolobe, had been stuck in the ice for two weeks and was behind schedule. The AWS unit prepared for EPF was not left at Tasmanian Cargo Services because there was considerable uncertainty about whether or not the AWS unit would be delivered to EPF for installation during the field season. Visited the Australian Antarctic Division in Kingston and met with Jack Sayers, Assistant Director and Dr. Paul Quilty, Chief Scientist. I was passed on to the local engineer, John Morrissy. Learned that the AWS units used by them were manufactured by Polar Research Labs. The ID's are 1171, 1172,1173, 1174, 1175, 1178, 1179, 1180, 1190, 8561. 1171, 1172, 1173, and the one at Law Dome are operating and received on the GTS. 1178 and 1180 are to be deployed in 1990-1991. In the afternoon I went to the Bureau of Meteorology, 20 Ellerslie Road, Hobart, Tasmania 7000, GPO Box 727G, Hobart, Tasmania 7001 where I was well received by Mr. Hugh Hutchinson, Regional Director. He supplied me with a list of the data received from the GTS. Eighteen USAP AWS units, four Australian AWS units, and four manned stations were received that day.

On 19 December 1990 Dr. Charles Swithinbank surprised me by coming to the Polar Sea for a visit. He suggested that I consider the Remnick Glacier for an AWS unit in the vicinity of Cape Adaire. The glacier has the potential for a blue ice runway. Suggested that I obtain USGS Professional Paper 1386B by him on the subject of blue ice runways in Antarctica.

The Polar Sea sailed from Hobart for McMurdo at 1000 on 19 December 1990.

Between 20 and 23 December 1990 the two dog house AWS units were assembled in the helo hanger. The one for the Balleny Islands was completed and turned on. The AWS dog house unit has 10 80 ampere hour batteries weighing 500 pounds and measures air temperature and pressure only.

23 December 1990

Arrived at Young Island in the Ballenys on 23 December 1990. Jonathan Berg flew around the island and reported a possible site for an AWS dog house on the north end of Young Island.

24 December 1990

On 24 December a helo flight was made to Young Island but the flight was turned back due to low visibility. Did not find a suitable site on Buckle Island.

26 December 1990

Dr.s Lettau and Berg flew to Sabrina Island and the Monolith. The Monolith might be a suitable site for a dog house but on that day the wind was from the east and too strong to make a landing on the small island. During the night the ship moved to the north end of Young Island.

27 December 1990

The dog house AWS was installed by helicopter sling load to Seal Island at the north end of Young Island at 66.28°S, 162.33°E, 30 meters based on a GPS receiver in the helo. The location of the Balleny Islands is shown in Figure 1 and Figure 2 is a map of Young Island showing the location of the AWS unit at the north end. The Polar Sea set sail for Cape Adair.

30 December 1990

Arrived at Cape Adair about 1400. The Possession Islands look like a good place to install another dog house AWS unit.

1 January 1991

Arrived at Terra Nova Bay. Flew to the Snow Cave Site on Inexpressible Island and removed the remains of 8929. Then on the way to Shristi site we stopped at Manuela Site. The AWS unit looked in good shape. The guys were reasonably tight. Stopped at Pat Site. The anchors were ablated out of the ice and the tower was tipped but not onto the ice. At Shristi site the aerovane was replaced. The snow surface was one foot below the tower junction. The unit will need to be raised or removed next season. The aerovane direction is reversed due to my error in the wiring when the unit was installed in the 1987–1988 season. On the return trip Pat site AWS was removed and taken to the Polar Sea. Figure 3 shows the Reeves Glacier and Inexpressible Island. Pat site was at the mid point of a line from Manuela site to Teall Nunatak.

Visited the Italian Station Baia Terra Nova. The station chief is Roberto Cervellati. I visited with the meteorologist Giusseppe Bacci, Weians Adamo, and Lorenzo De Silvestri. They requested that I send the WMO numbers and the AWS code to Dr. Pelligrini in Italy.

3 January 1991

Arrived in McMurdo and was flown ashore by helo. Met George, Shawn, and Bruce who had arrived from Christchurch at 0300. Spent the time from 3 to 13 January getting equipment ready for deployment.

13 January

Stearns, Smith, and Sinkula installed Pegasus South including the temperature profile in the ice. The AWS unit was 8937. Figure 4 shows the location of Pegasus South (P. South).

15 January 1991

Stearns, Sinkula, and Smith flew to Minna Bluff to look for a site for the AWS unit. One was found on loose rock at the crest with a clear view to the south. Surveyed the blue ice area four miles or more west of Pegasus North and decided that the area was not suitable for installing an AWS at this time. The area appears to be ablating and the anchoring of the tower would be a problem.

16 January 1991

In the early morning 1991 Stearns and Sinkula flew to Byrd Station with AWS 8903, antenna, antenna cable, and aerovane on a Nansen sled and a snow mobile to pull the sled. Went to the AWS site, rotated the boom +120 degrees, replaced the antenna cable and antenna. The unit beeped. The old antenna cable shield had parted from the connector and, as the antenna was a Chu, the ground connection through the shield was essential for the proper operation of the antenna.

17 January 1991

Since there was very little melt water at Pegasus South the ice temperature profile was not properly installed. Stearns, Smith, and Sinkula hauled 55 gallons of water to the site. We poured the water into the temperature profile hole. The water was nearly at the top of the hole when it disappeared. AWS box and boom were returned from Mt. Erebus. The AWS box was in excellent condition.

18 January 1991

Smith, Sinkula, and Stearns flew to Marilyn Site in a C-130. Temperature sensor was open at the cable to the AWS unit. The tower was raised with a five foot section -old type tower- and another boom was installed. Tower is now about 13 feet above the snow and another boom was installed. Delta T is three rungs of the old tower above the snow. Box base is just below upper tower joint. Solar panel is one section below the boom with junction box on back of top box bracket. No extensions need. Tower could be raised another five feet without extensions for batteries, power or solar panel. Radar reflector still six feet above the snow. There was low level or surface fog in the area which formed after we arrive. A snowmobile and sled were used to reach the site from the airplane. This worked well as we did not have to listen to the airplane noise. The required ground time was two hours and we just made it. Due to clouds we did not find Gill site.

22 January 1991

Minna Bluff site was installed at an elevation of about 900 m. The tower was a six foot section of the new tower type. Anchoring was to rock boards using 50 feet of chain to the tower. Two anchors were to the south and one to the east, west and north. The boom orientation is estimated to be 15 deg east of north. The boom is three feet long. Aerovane 84-537 was installed. The thermometer was tilted to avoid contact with the anchoring chains to the south. A iron stake was driven at least one foot into the rock through the hole in each sled and chain loop. The sleds were covered with rocks. Two stakes were driven into the tower base board. The batteries were place on the base board, and tied together and to the tower with rope. Figure 4 shows the location of the Minna Bluff site.

23 January 1991

Twin Otter flight was made to the Reeves Neve. Did not find Lynn Site but did find Sushila and Sandra. Booms were okay at both sites. Removed aws units for repairs and returned to McM. Battery voltage was low at Sushila site. Figure 3 shows the locations of the sites.

24 January 1991

Flew in the Twin Otter to Gill Site. Did not find the site immediately. Position by GPS with four satellites was 80 1.3', 178 37.5'W. Aircraft radar was not working properly and the station location was off by 5 miles from the table location. AWS 8925 was removed and AWS 8911 was installed. Tower did not need to be raised. Boom and aerovane checked out so they were left in place. Raised solar panel, box, and cables. Tower could be raised another five feet with the present cables. One battery cable was long and the other was about five feet. Battery voltage was 13.05 vdc. Bottom of delta T to snow was 18", snow to boom top was 112". 8911 beeped. Figure 5 shows the location of Gill site.

25 January 1991

Wilkniss gave us the task of establishing a meteorological research center

at the new science building and the requirements for support facilities such as an environmental test chamber and satellite receiving, data processing, and data archiving system.

26 January 1991

Took the twin otter to Reeves Neve. At Sushila site 75 24.4'S, 161 18.5'E by Trimble GPS installed one box of batteries trying to replace a battery box that may have had one battery that failed. Should have disconnected both the battery boxes then the solar panel would have charged the replacement batteries.

At Sandra site the repaired AWS unit was installed. The station beeped but the prop hit the bamboo pole holding the beaker and broke. The prop was replaced.

At Lynn site the aerovane was replaced. Lynn site position is different by 2 nmi from the table position. The site was found easily using the old position but by accident.

28 January 1991

Installed Linda site east of Minna Bluff in an area of hard snow surrounded by crevasses. Mark Sullivan was with us and we used the Kiwi helicopter 09. Used Pat site batteries. Figure shows the location of the site.

29 January 1991

Prepared the dog house for Scott Island and moved it to the Helo pad for transportation by sling to the Polar Sea. Expect the unit to be installed on Scott Island about 15 February 1991. The other AWS unit will be removed from Scott Island and returned to us. About 17 Feb. 1991 the Ice Breaker tried to fly the AWS unit to Scott Island but the sling broke on the way over and the unit dropped into the ocean. The other AWS unit was removed from the Island. Figure 1 shows the location of Scott Island.

Packed gear for storage and transportation to Madison as excess baggage and by ship.

1 February 1991

Left McMurdo for the return to Madison, Wi. Arrived in Madison 4 February 1991.

Summary of the 1990-1991 Field Season Activities:

Ice Breaker Activities:

1. Dog house AWS on north end of Young Island
2. Pat Site removed
3. Replaced aerovane at Shristi site
4. Removed last of Snow Cave site
5. Inspected Manuela site

McMurdo Area Activities

1. Repaired Byrd Station AWS antenna cable
2. Pegasus South site installed
3. Minna Bluff site installed
4. Marilyn site repaired
5. Repaired AWS unit at Sushila and Sandra sites
6. Replaced AWS unit at Gill site
7. Replaced aerovane at Lynn site

8. Bowers site was recovered
9. Mt. Erebus unit was returned
10. Jimmy site AWS was removed for use elsewhere
11. Linda site was installed

Antarctic Peninsula Activities

1. AWS from Hinge site moved to AGO-BAS site

Dumont d'Urville Activities

1. AWS 8914 at Port Martin replaced with 8934 that was in storage
2. AWS 814 installed at D-10
3. D-80 and D-47 are not being received

Plans for the 1991-1992 Field Season in Antarctica

a. Ice breaker cruise supposedly leaving Australia about 18 December 1991

1. C. Stearns and G. Weidner plan to make the cruise on the Ice breaker.
2. Stop at Dumont d'Urville to see Paul Petrie. Explore the possibility of a trip to D-47 and D-80 by the EPF.
3. Check D-10 site
4. Repair the following sites: Port Martin and Cape Denison,
5. Possibly install another AWS unit at a site selected by G. Wendler.
6. Stop at Balleny Islands, if possible, to look for the Buckle Island AWS unit and check on Young Island AWS unit.
7. Go to Scott Island and install a dog house AWS unit.
8. Install a dog house AWS on Possession Island.
9. Stop at Terra Nova Bay and remove or raise Shristi site.
10. Stop at Franklin Island and install new wind speed and direction ROM.
11. Martha Site-Raise the tower
12. Install AWS unit at 79.00°S, 158.°W and 78.00°S, 177.50°E, and on Beaufort Island.

AWS units needed: New, dog houses, 2; New, 4; Repair: 3, Recover: 1-2

b. McMurdo area.

1. At South Pole install temperature profile to -16 m.
2. Install test AWS site at Williams Field.
3. Use the twin otter aircraft to install AWS units at Elaine, 82.00°S, 158.00°W; 85.00°S, 158.00°W; and on the Byrd Glacier Neve AT 80.50°S, 152.00°E.
4. Remove AWS units at Sushila, Sandra, and ~~Lynn sites~~ using twin otter.
5. AWS unit for the top of Mt. Erebus.

AWS units needed: New, 5; Recover, 3.

Table 1. AWS locations in Antarctica for 1991. The latitude and longitude are in degrees and hundredths of degrees not degrees and minutes. ID is the ARGOS identification number transmitted by the AWS unit.

Site	ID	Lat. Deg.	Long. Deg.	Elev. (m)
		Adelie Coast		
D-10	8914	66.70°S	139.80°E	240
D-47	8916	67.38°S	138.72°E	1560
Dome C	8904	74.50°S	123.00°E	3280
Port Martin	8934	66.82°S	141.39°E	39
Cape Denison	8933	67.02°S	142.68°E	31
		Maria Byrd Land Stations		
Byrd Station	8903	80.00°S	120.00°W	1530
Siple Station	8910	75.90°S	83.92°W	1054
		Ross Island Region		
Marble Point	8906	77.43°S	163.75°E	120
Ferrell	8907	78.02°S	170.80°E	45
Jimmy (Not installed)		77.87°S	166.81°E	202
Pegasus North	8927	77.95°S	166.51°E	10
Pegasus South*	8937	78.03°S?	166.60°E?	10?
Minna Bluff*	8935	78.50°S?	166.51°E?	1000?
Linda*	8915	78.50°S	168.35°E	50?
		Southern Ocean Islands		
Whitlock	8913	76.24°S	168.70°E	275
Young Island*	8980	66.28°S	162.33°E	30
Scott Island (Not Installed)		67.37°S	179.97°W	30
		Ross Ice Shelf		
Marilyn	8931	79.98°S	165.03°E	75
Schwerdtfeger	8924	79.94°S	169.83°E	60
Gill*	8911	80.03°S	178.63°W	55
Lettau	8908	82.59°S	174.27°W	55
Martha II	8900	78.38°S	173.42°W	18
		Terra Nova Bay		
Manuela	8905	74.92°S	163.60°E	80
Shristi	8909	74.72°S	161.58°E	1181
Sushila*	8921	74.41°S	161.31°E	1441
Sandra*	8923	74.48°S	160.48°E	1525
Lynn*	8901	74.21°S	160.39°E	1772
		Antarctic Peninsula		
Larsen Ice	8926	66.97°S	60.55°W	17
Butler Island	8902	72.20°S	60.34°W	91
Uranus Glacier	8920	71.43°S	68.93°W	780
Cape Adams	8917	75.01°S	62.53°W	?
BAS-AGO*	8932	77.52°S	23.74°W	1545
Racer Rock	8930	64.16°S	61.54°W	17
		South Pole		
Clean Air	8918	90.00°S		2835

* New Site for 1991

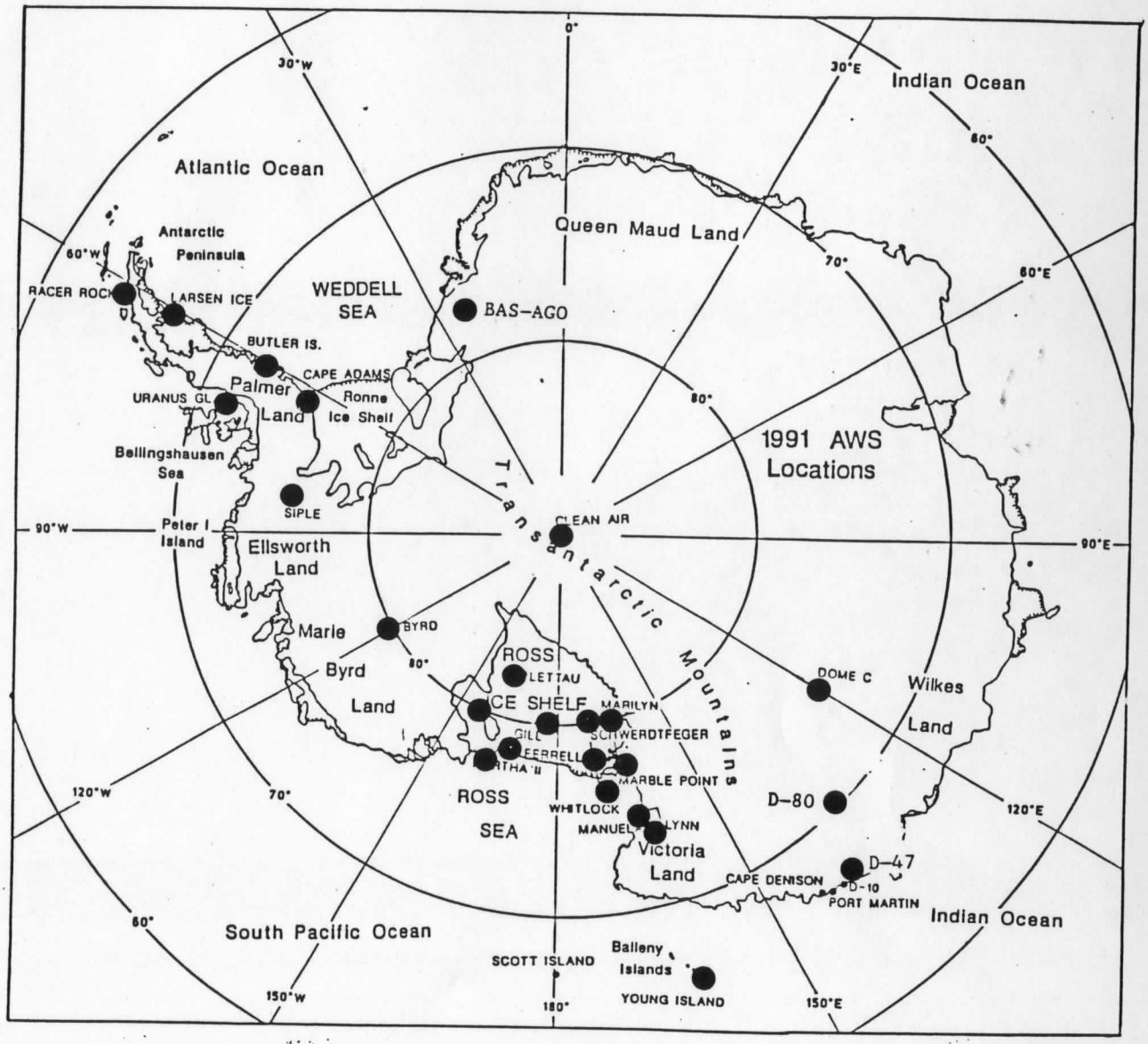

Figure 1. Map of Antarctic showing the AWS locations for 1991. Cape Denison, Port Martin and D-10 are small dots. Scott Island is not active.

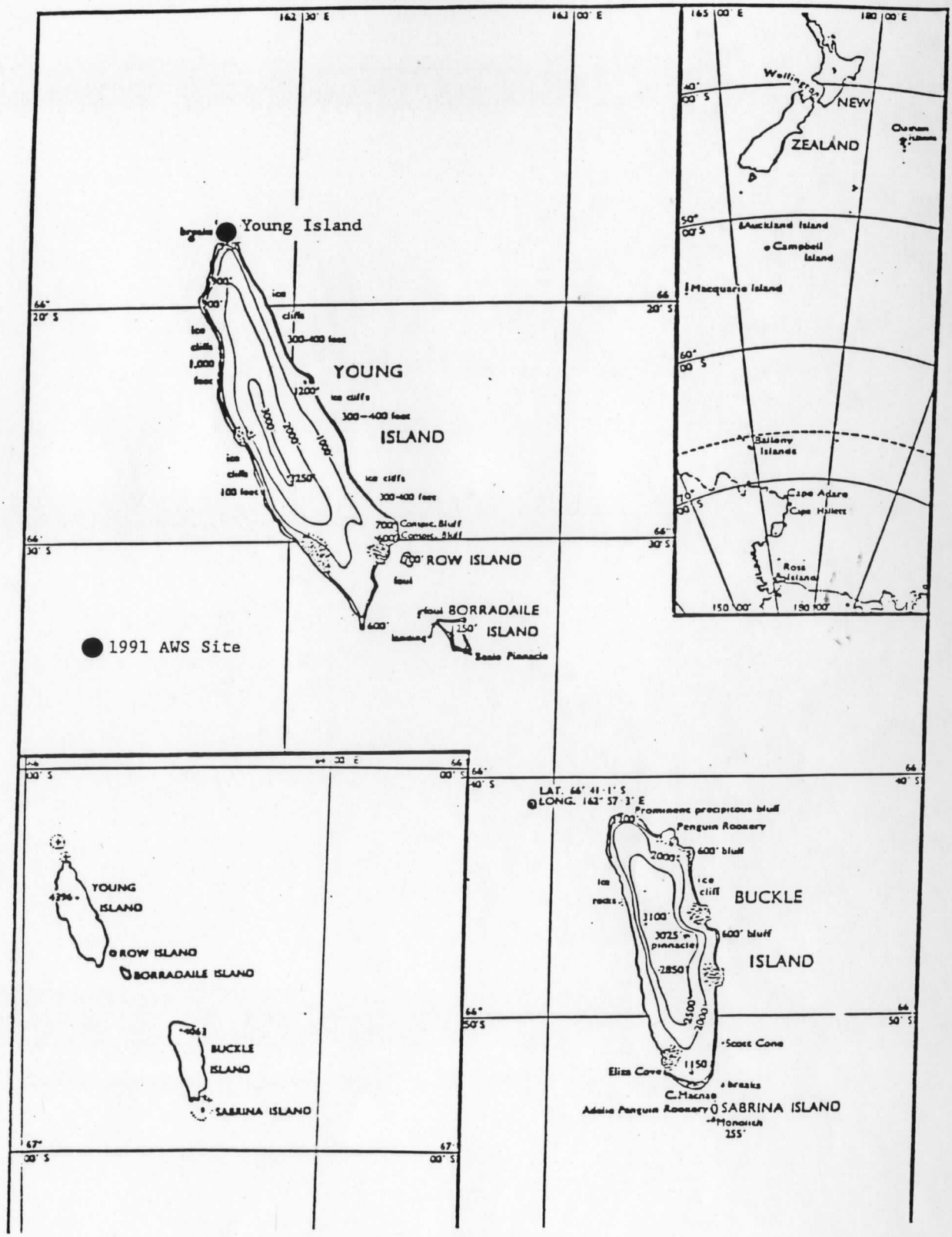

Figure 2. Map of the Balleny Island showing the location of the AWS at the north end of Young Island.

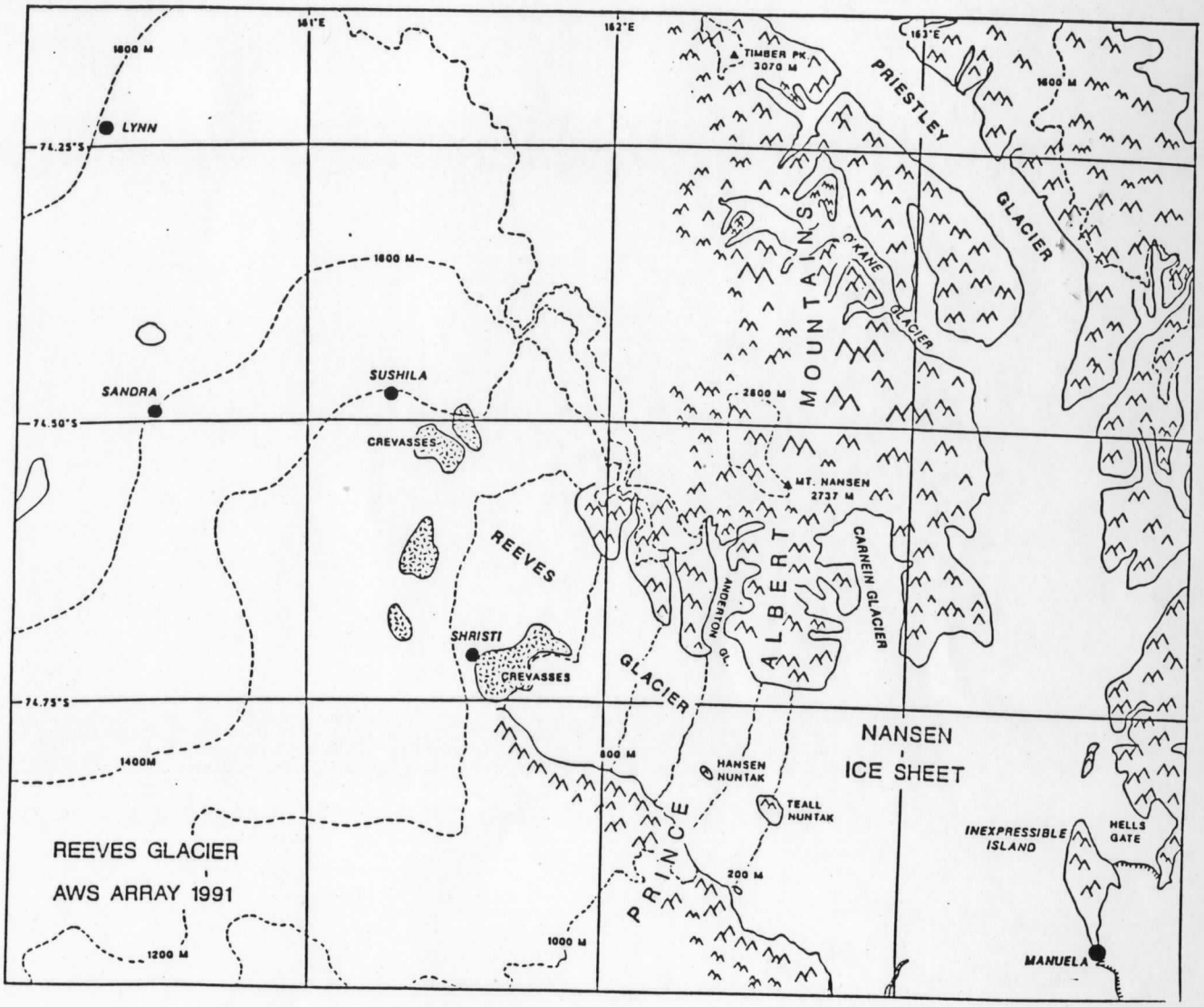

Figure 3. Map of the Reeves Glacier area showing the AWS units installed for 1991.

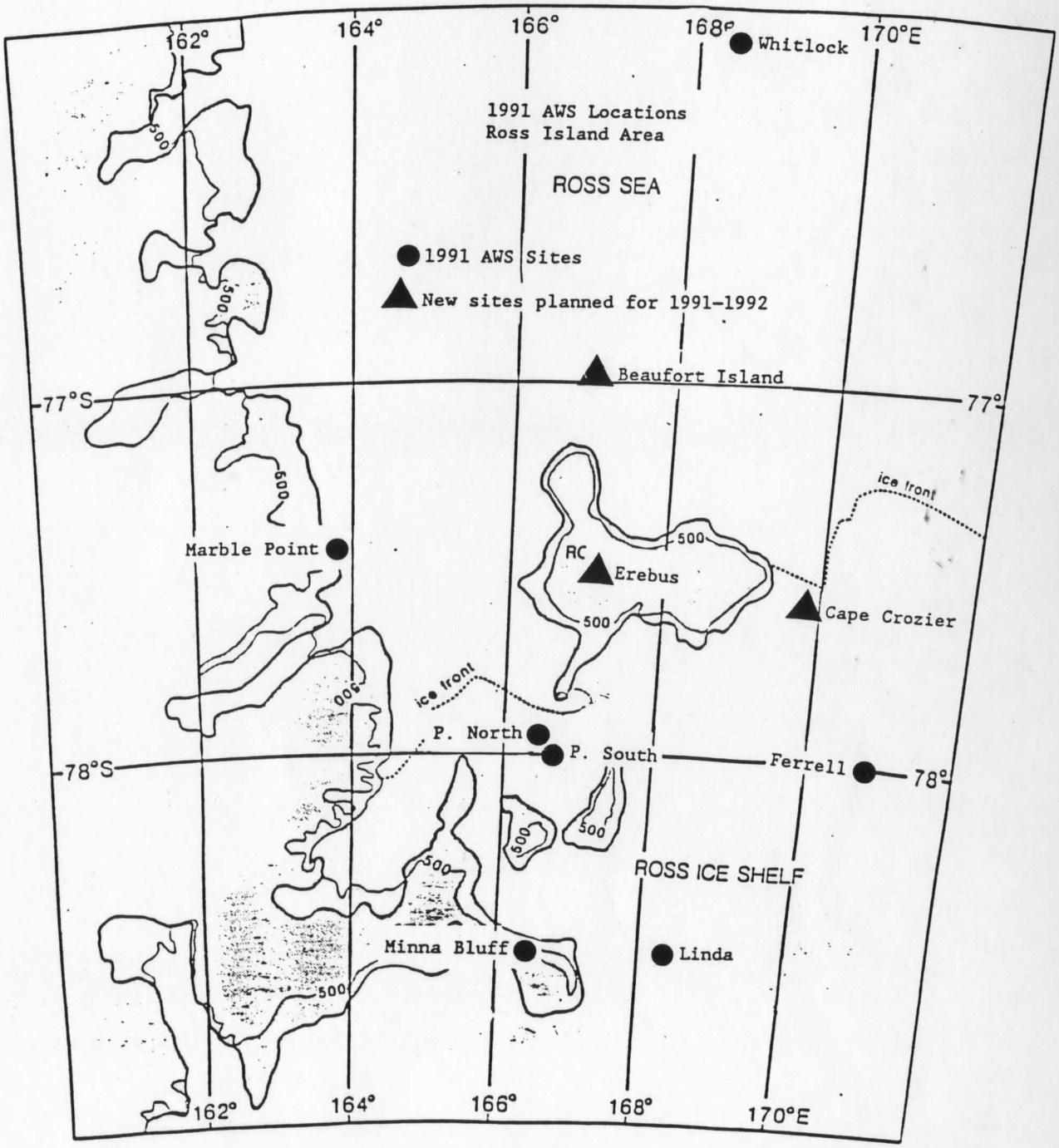

Figure 4. Map of the Ross Island area showing the AWS units installed for 1991 and the sites selected for installation of AWS units during the 1991-1992 field season in Antarctica.

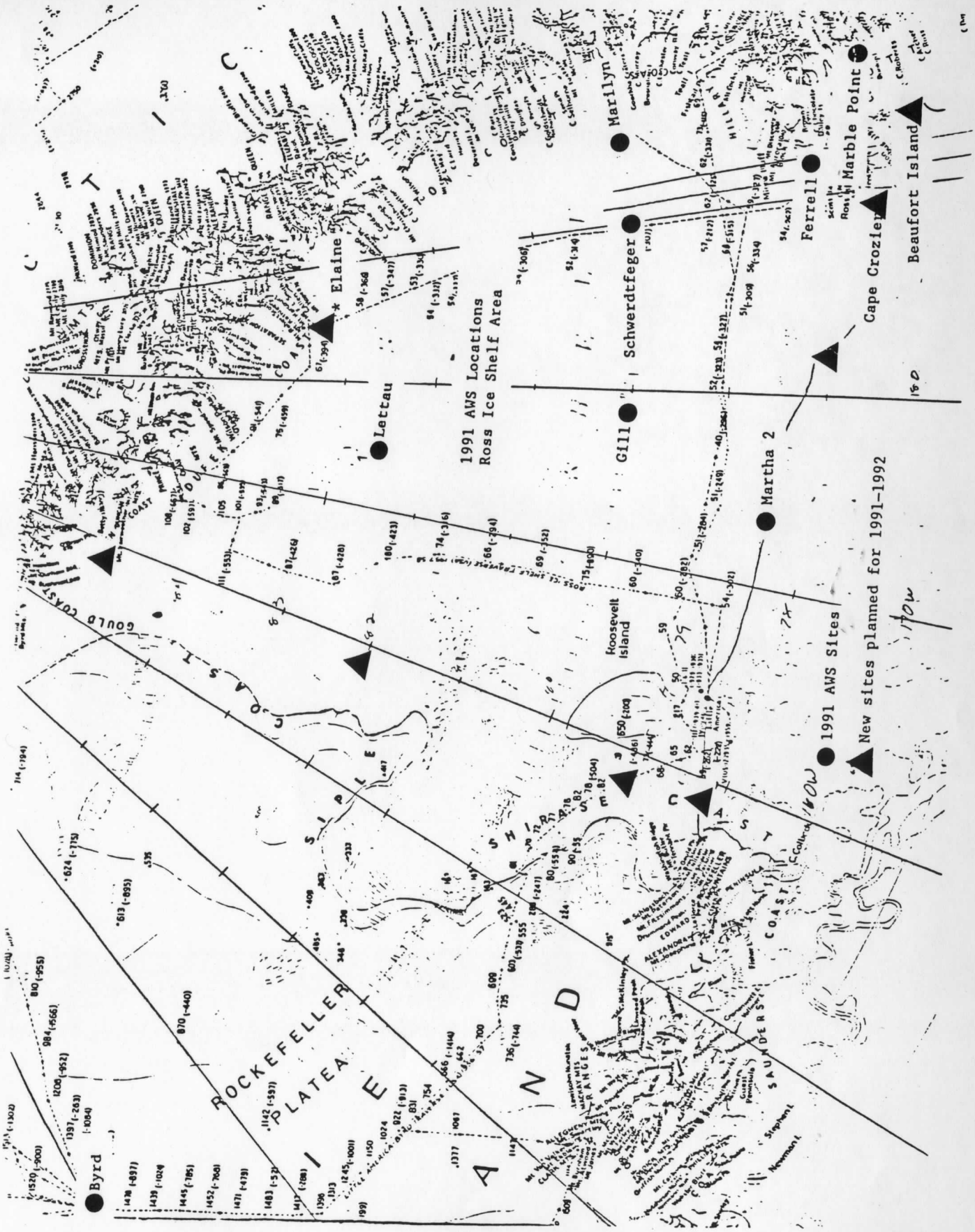

Figure 5. Map of the Ross Ice Shelf showing the locations of the AWS units for 1991. Linda, Minna Bluff, Pegasus South and Pegasus North sites are not shown but they are shown in Figure 4.

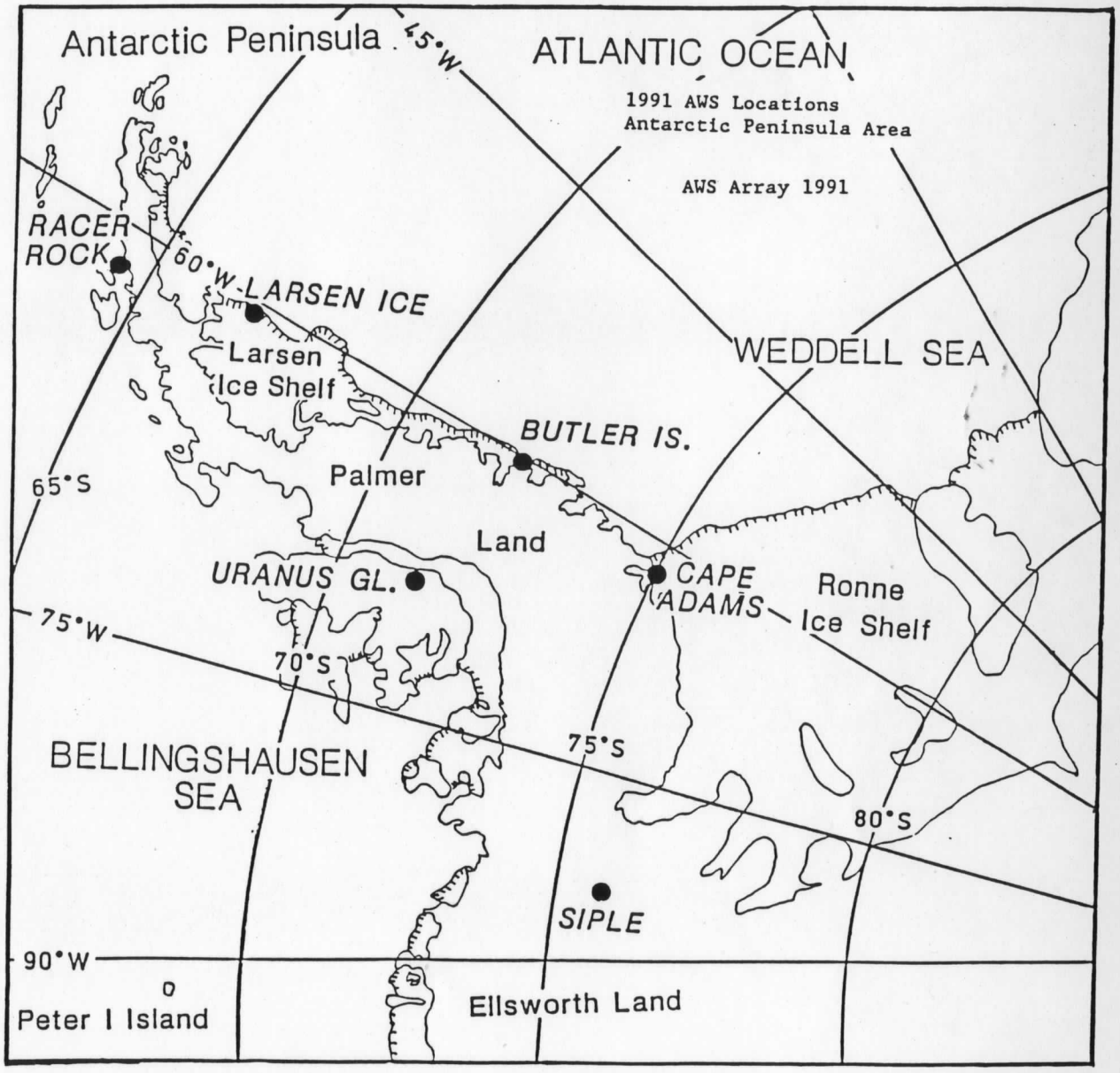

Figure 6. Map of the Antarctic Peninsula area show the AWS locations for 1991.